

VI. CLAIMS

What is claimed is:

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1. A method for testing organic contaminants in soil comprising the steps of:
 - selecting a soil sample;
 - selecting an organic contaminant test substance suitable with said soil sample;
 - adding said organic contaminant test substance to said soil sample to create a soil testing sample;
 - 10 putting said soil testing sample in said cylindrical container;
 - axially restraining a plurality of interchangeable rotationally configured stir implements with a shaft element in said cylindrical container;
 - detachably connecting said plurality of interchangeable rotationally configured stir implements to said shaft element;
 - 15 providing a multi-directional restraint for said plurality of interchangeable rotationally configured stir implements;
 - enclosing said soil testing sample in said cylindrical container;
 - sealing said soil testing sample from said motor;
 - 20 powering a motor to which said shaft element is responsive;
 - stirring said soil testing sample causing common axial displacement by said plurality of interchangeable rotationally configured stir implements to create an extraction sample; and
 - 25 analyzing said extraction sample to determine the presence of an organic contaminant.
2. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of divergently displacing said soil testing sample in said cylindrical container with one of said interchangeable rotationally configured stir implements.

3. A method for testing organic contaminants in soil in claim 2 wherein said step of divergently displacing said soil testing sample comprises the step of divergently displacing said soil testing sample with an angularly displaced circular element.

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4. A method for testing organic contaminants in soil in claim 2 wherein said step of divergently displacing said soil testing sample comprises the step of divergently displacing said soil testing sample with an angularly displaced linear element.

10 5. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of shearing said soil testing sample in said cylindrical container with one of said interchangeable rotationally configured stir implements.

15 6. A method for testing organic contaminants in soil in claim 5 wherein said step of shearing said soil testing sample comprises the step of shearing said soil testing sample with an angularly displaced circular element.

20 7. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of gently displacing said soil testing sample with one of said interchangeable rotationally configured stir implements.

25 8. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of gently displacing plant material with one of said interchangeable rotationally configured stir implements.

30 9. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of gently displacing stringy plant material with one of said interchangeable rotationally configured stir implements.

10. A method for testing organic contaminants in soil in claim 8 wherein said step of gently displacing plant material comprises the step of gently displacing stringy plant material with a round ended bar element.

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11. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of displacing said soil testing sample having at least small rocks.

10 12. A method for testing organic contaminants in soil in claim 11 wherein said step of displacing said soil testing sample having at least some small rocks comprises displacing said soil testing sample with an angularly displaced linear element.

13. A method for testing organic contaminants in soil in claim 1 wherein said step of 15 selecting said soil sample comprises the step of selecting a soil sample having at least small rocks.

14. A method for testing organic contaminants in soil in claim 1 wherein said step of selecting said soil sample comprises the step of selecting a soil sample having at least 20 plant material.

15. A method for testing organic contaminants in soil in claim 1 wherein said step of selecting said soil sample comprises the step of selecting a soil sample having at least stringy plant material.

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16. A method for testing organic contaminants in soil in claim 1 wherein said step of analyzing said extraction sample to determine the presence of said organic contaminant comprises the step of selecting an analysis element from the group consisting of UV absorption spectroscopy, visible absorption spectroscopy, fluorescence spectroscopy, raman spectroscopy, gas chromatography, mass 30

spectrometry, atomic fluorescence, atomic absorption, atomic emission, electrochemistry, colorimetric reactions, titration, and gravimetric analysis.

17. A method for testing organic contaminants in soil in claim 1 wherein said step of
5 selecting said organic contaminant test substance comprises the step of selecting said organic contaminant test substance from the group consisting of organic solvents and aqueous solvents.

18. A method for testing organic contaminants in soil in claim 1 wherein said step of
10 selecting said organic contaminant test substance comprises the step of selecting said organic contaminant test substance from the group consisting of alcohols, aliphatic hydrocarbons, aromatic hydrocarbons, chlorinated solvents, ketones, esters, amines, ethers, sulfides, carboxylic acids, and surfactant solutions.

15 19. A method for testing organic contaminants in soil in claim 1 wherein said step of
analyzing said extraction sample to determine the presence of said organic contaminant comprises the step of analyzing to determine said organic contaminant selected from the group consisting of diesel, tar, motor oil, fuel oil, petroleum, coal tar, gasoline, aviation gasoline, and synthetic motor oil.

20 20. A method for testing organic contaminants in soil in claim 1 wherein said step of
axially restraining said plurality of interchangeable rotationally configured stir implements in said cylindrical container comprises the step of locating said interchangeable rotationally configured stir implements above said soil testing
25 sample.

21. A method for testing organic contaminants in soil in claim 1 wherein said step of
stirring said soil testing sample comprises the step of rotating said shaft element.

22. A method for testing organic contaminants in soil in claim 21 wherein said step of rotating said shaft element comprises the step of continuously rotating said shaft element.

5 23. A method for testing organic contaminants in soil in claim 1 and further comprising the step of magnetically coupling said shaft element to said motor.

10 24. A method for testing organic contaminants in soil in claim 1 wherein said step of sealing said soil testing sample from said motor comprises the step of magnetically sealing said soil testing sample from said motor.

15 25. A method for testing organic contaminants in soil in claim 1 and further comprising the steps of:
selecting a drying element; and
adding said drying element to said soil sample.

20 26. A method for testing organic contaminants in soil in claim 25 wherein said step of selecting said drying element and adding said drying element to said soil sample comprises the steps of selecting calcium oxide and adding said calcium oxide to said soil sample.

25 27. A method for testing organic contaminants in soil in claim 1 wherein said step of powering said motor comprises the step of regulating the speed of said stirring said soil testing sample.

28. A method for testing organic contaminants in soil in claim 1 wherein said step of powering said motor comprises the step of regulating a voltage to which said shaft element is responsive.

29. A method for testing organic contaminants in soil in claim 1 wherein said step of powering said motor comprises the step of powering said motor with a battery.

30. A method for testing organic contaminants in soil in claim 1 wherein said step of stirring said soil testing sample comprises the step of maintaining a constant stirring speed of said soil testing sample.

31. A method for testing organic contaminants in soil in claim 1 wherein said step of enclosing said soil testing sample in said cylindrical container comprises the step of enclosing said soil testing sample in said cylindrical container with a jar cover.

32. A method for testing organic contaminants in soil in claim 1 and further comprising the step of housing at least said motor in a cylindrical encasing.

33. A method for testing organic contaminants in soil in claim 32 and further comprising the step of cylindrically aligning an exterior of said cylindrical container, said enclosing element, and said cylindrical encasing.

34. A method for testing organic contaminants in soil in claim 1 wherein said step of selecting said soil sample comprises the step of screening said soil sample to remove larger items from said soil sample.

35. A method for testing organic contaminants in soil in claim 1 and further comprising the steps of:
removing an enclosing element from said cylindrical container;
removing said shaft element and plurality of interchangeable rotationally configured stir implements from said cylindrical container;
rinsing said shaft element, said plurality of interchangeable rotationally configured stir implements, and said cylindrical container; and
decontaminating at least said motor and said enclosing element.

36. An organic contaminant testing system for soil comprising:

- a cylindrical container having an opening;
- a soil sample;

5 an organic contaminant test substance;

- a cylindrical removable enclosing element configured to cover said opening of said cylindrical container;
- a shaft element through said cylindrical removable enclosing element;
- a seal interposed adjacent to said shaft element and cylindrical removable enclosing element;

10 an interchangeable rotatably configured stir implement;

- a multi-directional restraint to which said interchangeable rotatably configured stir implement is responsive;
- a user detachable connection element connecting said interchangeable rotatably configured stir implement to said shaft element;
- a motor to which said shaft element is responsive;
- a power source to which said motor is responsive; and

15 an analysis element to test said soil sample for an organic contaminant.

20 37. An organic contaminant testing system for soil in claim 36 wherein said interchangeable rotatably configured stir implement is selected from the group consisting of a round ended bar element, an angularly displaced circular element, an angularly displaced linear element, a divergent displacer element; and a gentle displacer element.

25 38. An organic contaminant testing system for soil in claim 36 wherein said interchangeable rotatably configured stir implement and said soil sample are selected from the group consisting of:

- a round ended bar element used with plant material,
- 30 round ended bar element used with stringy plant material,

a divergent displacer element used with small rocks,
a gentle displacer element used with plant material,
a gentle displacer element used with stringy plant material, and
an angularly displaced linear element used with small rocks.

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39. An organic contaminant testing system for soil in claim 36 wherein said soil sample comprises at least small rocks.

40. An organic contaminant testing system for soil in claim 36 wherein said soil sample 10 comprises at least plant material.

41. An organic contaminant testing system for soil in claim 36 wherein said soil sample comprises at least stringy plant material.

15 42. An organic contaminant testing system for soil in claim 36 wherein said analysis element is selected from the group consisting of UV absorbtion spectroscopy, visible absorption spectroscopy, fluorescence spectroscopy, raman spectroscopy, gas chromatography, mass spectrometry, atomic fluorescence, atomic absorption, atomic emission, electrochemistry, colorimetric reactions, titration, and gravimetric analysis.

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43. An organic contaminant testing system for soil in claim 36 wherein said organic contaminant test substance is selected from the group consisting of organic solvents and aqueous solvents.

25 44. A method for testing organic contaminants in soil in claim 36 wherein said organic contaminant test substance is selected from the group consisting of alcohols, aliphatic hydrocarbons, aromatic hydrocarbons, chlorinated solvents, ketones, esters, amines, ethers, sulfides, carboxylic acids, and surfactant solutions.

45. An organic contaminant testing system for soil in claim 36 wherein said soil sample comprises at least fuel.
- 5 46. An organic contaminant testing system for soil in claim 45 wherein said fuel is selected from the group consisting of diesel, tar, motor oil, fuel oil, petroleum, coal tar, gasoline, aviation gasoline, and synthetic motor oil.
- 10 47. An organic contaminant testing system for soil in claim 36 wherein said interchangeable rotationally configured stir implements are located above soil sample.
- 15 48. An organic contaminant testing system for soil in claim 36 and further comprising a clutch assembly to which said shaft element is responsive.
- 50 49. An organic contaminant testing system for soil in claim 48 wherein said clutch assembly comprises a magnetic clutch assembly.
- 20 51. An organic contaminant testing system for soil in claim 36 and further comprising a drying element.
52. An organic contaminant testing system for soil in claim 51 wherein said drying element comprises calcium oxide.
- 25 53. An organic contaminant testing system for soil in claim 36 and further comprising a speed regulator.
- 30 54. An organic contaminant testing system for soil in claim 36 and further comprising a circuit.

55. An organic contaminant testing system for soil in claim 36 wherein said power source comprises a battery.

5 56. An organic contaminant testing system for soil in claim 36 and further comprising a constant speed regulator of said shaft element and said interchangeable rotationally configured stir implements.

10 57. An organic contaminant testing system for soil in claim 36 wherein said cylindrical removable enclosing element comprises a jar cover.

58. An organic contaminant testing system for soil in claim 36 and further comprising a cylindrical encasing around said motor.

15 59. An organic contaminant testing system for soil in claim 58 wherein said cylindrical encasing around said motor is selected from the group consisting of a polypropylene encasing, glass encasing, polyphenylene sulfide encasing, polyethylene encasing, chlorofluorocarbon polymer encasing, teflon polymer encasing, and polyphthalamide encasing.

20 60. An organic contaminant testing system for soil in claim 36 wherein said cylindrical removable enclosing element is selected from the group consisting of a polypropylene element, glass element, polyphenylene sulfide element, polyethylene element, chlorofluorocarbon polymer element, teflon polymer element, and polyphthalamide element.

25 61. An organic contaminant testing system for soil in claim 36 wherein said cylindrical container is selected from the group consisting of polypropylene container, glass container, polyphenylene sulfide container, polyethylene container,

chlorofluorocarbon polymer container, teflon polymer container, and polyphthalamide container.

62. An organic contaminant testing system for soil in claim 36 wherein said cylindrical removable enclosing element comprises an encasing for at least said motor.

5 63. An organic contaminant testing system for soil in claim 49 wherein said cylindrical removable enclosing element comprises an encasing for at least said motor and said magnetic clutch assembly.

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64. An organic contaminant testing system for soil in claim 49 wherein said cylindrical removable enclosing element, said cylindrical container, and said magnetic clutch assembly comprises a cylindrically aligned exterior.

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65. An organic contaminant testing system for soil in claim 49 wherein said motor, said magnetic clutch assembly, and said cylindrical container comprises a top, middle, and bottom arrangement, respectively.

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66. An organic contaminant testing system for soil in claim 49 wherein said cylindrical removable enclosing element, said magnetic clutch assembly, and said cylindrical container comprise a coaxial arrangement.

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67. An organic contaminant testing system for soil in claim 63 wherein said encasing, said cylindrical removable enclosing element, and said cylindrical container comprises a cylindrically aligned exterior.